Surface Storage Investigations Program Information Table—Preliminary Information Subject To Change
BDPAC Water Supply Subcommittee

	Shasta Lake Water Resources Investigation	North-of-the-Delta Offstream Storage	In-Delta Storage (Delta Wetlands)	Los Vaqueros Expansion Investigation	Upper San Joaquin River Basin Storage Investigations
Project purposes(Main Objectives) of the project	• Increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the Red Bluff Diversion Dam (RBDD) • Increase water supplies and water supply reliability for agricultural, M&I, and environmental purposes to help meet future water demands, with a focus on enlarging Shasta Dam and Reservoir	• Increase water supply and water supply reliability and Sacramento Valley water management flexibility • Improve Delta water quality • Increase the survival of anadromous fish populations in the Sacramento River, as well as the health and survivability of other aquatic species	• Increase water supply and water supply reliability and Sacramento Valley water management flexibility • Improve Delta water quality • Provide ecosystem restoration benefits within the Delta	Expand the existing 100 TAF, off stream Los Vaqueros Reservoir up to 275 TAF in order to: • Increase Water Supply Reliability for the Bay Area • Improve Bay Area Water Quality • Provide Environmental Water for Delta Fisheries Protection	• Enhance water temperature and flow conditions to restore and maintain naturally reproducing and self-sustaining anadromous fish in the San Joaquin River from Friant Dam to the Merced River; and support restoration of related aquatic, riparian, and terrestrial habitat • Increase water supply reliability to Friant Division water users • Facilitate water exchanges that improve water quality for urban areas
Water supply benefits Note: Water supply, water quality and Ecosystem benefits are not additive, because the ranges are derived from different operation scenarios.	Driest periods average: up to 133 TAF/year	Long-term average: 150 - 403 TAF/year Driest periods average: 110 - 390 TAF/year	Long-term average: 65-70 TAF/year (2006) Driest periods average: Approximately ½ of average year benefits (2004)	Long-term average: • 143 TAF annual average emergency supplies to Bay Area water users. • Up to 175 TAF emergency supply	Long-Term Average: 165- 183 TAF/year (based on pre-Settlement flows)
Water quality benefits	NA	Long-term average: 69 - 176 TAF/year Driest periods average: 34 - 186 TAF/year Up to 9% average reduction in chloride/bromide concentration at Banks Pumping Plant	Long-term average: 23-36 TAF/year (Maximum release of 1,500 cfs from reservoir islands) For average years, the Chloride benefit was minimal (-0.2 to -0.4 mg/L Chloride). In critically dry years, Chloride minimums (max benefit) are -29.4 to -62.5 mg/L Chloride. Degradation in Chloride levels in wet years often occurs when project is not in operation. Results need more review and refinement.	Bay Area Water quality benefits calculations are not final but preliminary modeling showed significant reductions in salinity and total organic carbon to Bay Area water agencies served by the South Bay Aqueduct. Also provides water quality benefits for CCWD.	Water quality benefits have not been calculated. • San Joaquin River water quality might be improved through the addition of higher quality Sierra water supplies and increased flows downstream of Friant Dam. • Urban water quality benefits could also be realized through exchanges between Friant Water Users Authority and Metropolitan Water District of Southern California (MWD).
Ecosystem restoration benefits	Up to 378 TAF for the 18.5 Ft. raise of Shasta Dam	Long-term average: 140 - 240 TAF/year (Estimated yield that could be delivered for supply if ecosystem actions were not done)	Long-term average: 15-19 TAF/year	Long-term average: 60 – 140 TAF/year, Environmental water supply benefits	Water temperature and flow conditions on the San Joaquin River could be enhanced to support the Settlement fishery restoration goals.

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Ecosystem restoration benefits (continued)	Ecosystem restoration actions: • Significantly increase the cold water pool in Shasta Reservoir and the ability of Shasta Dam to help regulate water temperature in the upper Sacramento River, primarily in dry and critically dry years.	Ecosystem restoration actions: • Provide stable fall flows – Keswick to Colusa • Increase Shasta cold water pool • Improve RBDD fish passage • Reduce Diversions at T-C and GCID Canals during critical fish migration periods • Provide supplemental flows for cottonwood establishment	Ecosystem restoration actions: • Create two habitat islands on Bouldin and Holland Islands • Provide ERP flows	Ecosystem restoration actions: • Project provides a net benefit to Delta fisheries and includes positive-barrier fish screens on Delta intakes.	
EWA benefits (included in Water Supply Total)	Not measured yet, but could Contribute to the EWA through potential operational changes.	Long-term average: 42 - 93 TAF/year Driest periods average: 15 - 64 TAF/year	Long-term average: 6-11 TAF/year	Long term average: 60-140 TAF/year Driest periods average: 42-65 TAF Some alternatives being evaluated could wheel EWA water purchased north of the Delta into Bethany Reservoir when Banks Pumping Plant is at full capacity.	Not calculated yet, but could be expected as an indirect effect of developing water quality exchanges between FWUA and MWD.
Non flow related benefits	• Hydropower • Flood Control • Ecosystem Restoration • Recreation •	• Recreation • Flood control • Hydropower • NODOS does not require Red Bluff Diversion Dam operation	• Wildlife Habitat islands • Flood damage reduction to adjacent islands • Recreation on project islands	• Maintain existing flood control benefits • Improve existing recreation benefits including expanded facilities for the marina, fishing, hiking and interpretive center.	• Recreation • Flood control • Hydropower
Range of possible project impacts on fish and wildlife	Potential to inundate up to 2,570 acres of reservoir rim habitat. Some short-term adverse impacts to reservoir fish.	Diversion of winter flows to fill Sites Reservoir may increase juvenile impingement of all salmonid runs (steelhead and all four Chinook runs). However, any effects should be reduced by the state-of-the-art fish screens at the diversion locations. Field surveys have found various species of amphibians, reptiles, mammals, invertebrates, and birds within the reservoir footprint. Surveys did not find any species that cannot be mitigated. Impacts to these biological resources will be mitigated.	Aquatic resources: Eliminate shallow water habitat during construction (80 acres). Use fish screens to protect aquatic species. Water Quality: Dissolved organic carbon impacts due to releasing water from delta islands Potential cultural resource issues resolved with NHPA consultation Mitigation required for special status plant species Some hazardous material removal would be required.	Project will provide a net benefit to Delta fisheries due to development of environmental water and design of intakes with state-of-the-art fish screens. Operation of project is designed to avoid significant impacts to fish and wildlife in Delta and to other Delta water users. Studies show there is ample habitat available within Eastern Contra Costa County to mitigate terrestrial impacts.	Not evaluated yet.

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Impacts on project site (environmental and cultural) Impacts on project site (environmental and cultural) (continued)	Analysis is in progress	Habitat (acres) Grassland 16,311 Blue oak 924 Blue oak/foothill pine 494 Riparian 75 Wetlands 250 Pre-historic cultural resources 45 sites Historic cultural resources 27 sites	Habitat (acres) Ag land lost: Reservoir Is 10,860 Habitat Is. (partial loss) 9,000 *HMP to mitigate loss of foraging habitat.* Pre-historic cultural resources Sites exist Historic cultural resources Sites exist	Habitat up to (acres) Grassland 992 Upland Scrub 4.4 Valley/Foothill Woodland and Forest 112 Valley/Foothill Riparian 8 Wetlands *under evaluation* Cultural resources 17 sites	Habitat TF 274acres FG acres Woodland 2,727 4,927 Chaparral 40 5 Riverine 113 72 Grassland 179 414 Riparian 0 8 Lacustrine 355 11 Other 74 6 Pre-historic and historic not completed
Global warming aspects	Enlarged reservoir can mitigate the loss of snowpack storage due to climate change.	Sites Reservoir can mitigate the loss of snowpack storage due to climate change. Preliminary model studies indicated that Sites Reservoir can make up most of the water supply loss due to climate change.	Embankments designed to take into account sea level rise during the economic life of the project (50-years). Costs are included in annual O&M. Initial modeling for global climate change was simulated using CALSIM, and shows "marginal changes in water supplies." (Figure 3.13, 2004 Draft State FSR)	The recent Public Policy Institute of California (PPIC) report and other sources suggest that an expanded reservoir at this location in the Delta could help the state protect against climate change, particularly in the Opportunistic Delta and Sustainable Delta scenarios presented in the PPIC report. The project location allows for the capture and storage of early runoff and Delta surplus and is not in danger of spilling due to upstream flows. The expansion project fits in very well with most projections of climate change in California.	Not evaluated yet
Sensitivity with Delta conveyance	Preliminary model studies indicated that an Enlarged Shasta Reservoir can perform at a similarly favorable level with existing or enlarged Delta conveyance.	Preliminary model studies indicated that Sites Reservoir can perform at a similarly favorable level with existing or enlarged Delta conveyance.	Benefits increase approximately 12 percent when Banks Pumping Plant operates at 8,500 cfs (107 to 120 TAF) (Table 3.6, 2006)	• Project is not sensitive to pumping constraints at Banks • The project could be compatible with a through Delta and potentially a dual conveyance scenario • The project would be sensitive to changes in Delta water quality due to reduced flows of fresh water into the Delta, like those potentially caused by a PC	Not sensitive

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Interaction with other proposed projects (cumulative effects)	Cumulative effects have not been evaluated.	Cumulative effects have not been evaluated.	Cumulative effects have not been evaluated.	Cumulative effects are currently being analyzed for the Draft EIS/EIR.	Cumulative effects have not been evaluated.
Total estimated current cost , 2006 price levels (range for different sized projects) (Cost estimates are at pre-feasibility level of detail (IDSP is at State Feasibility Level) and do not include interest during construction and annual operations and maintenance and power costs).	Construction cost estimates: $530 million for a 6.5 foot dam raise $825 million for a 18.5 foot dam raise	Construction cost estimates: $2.06 to $3.01 billion	Construction cost estimates: $789 million	Construction cost estimate: $550 million	Construction cost estimates: Fine Gold Reservoir – $640 M Temperance Flat RM274 – $1 B Temperance Flat RM279 - $1-B These costs have been revised and updated and are currently under detailed review by Reclamation. Costs can be expected to increase substantially and perhaps almost double primarily from the addition of temperature control devices to the alternatives and the substantial increase in material costs.
Cost per AF of yield for human use (irrigation, M&I), 2006 price levels	Approximately $200 per acre foot.	$340 per acre-foot	Not calculated using SC-RB	$330/AF cost for EWA replacement supplies	To be determined. Early evaluation by DWR based on $2 Billion cost and 183 TAF yield, 50 percent of yield for supply: $350 per acre foot.
Identification of potential beneficiaries	Potential beneficiaries include: • WAPA • NCPA • SMUD • Westlands • Public	Potential beneficiaries include: • CVP contractors • SWP contractors • Environmental Water Account (or its successor) • Ecosystem Restoration Program (State and Federal governments) • Individual Water Agencies or Water Users • Sacramento Valley partners • Public	Potential beneficiaries include: • Central Valley Project contractors • State Water Project contractors • Environmental Water Account (or its successor) • Ecosystem Restoration Program (State and Federal governments) • Public	Potential beneficiaries include: • State and/or Federal agencies responsible for Delta fisheries protection • Bay Area M&I water agencies • (SWP and/or CVP contractors including CCWD). • Public	Potential beneficiaries include: • Friant Water Users • Central Valley Project • State Water Project • Public
Planning Report Schedule					
Initial Alternatives Information Plan Formulation Draft Feasibility Study- DEIS/EIR Final FSR- EIS/EIR	June 2004 Spring 2007 Late 2007 Late 2008	May 2006 Fall 2007 Spring 2008 Late 2008	 January 2004 (State FSR) May 2006 (State Supplement)	September 2005 June 2006 (Economic Evaluation) Spring 2008 Early 2009	June 2005 Mid-Late 2007 Mid 2008 Mid 2009